

# The Sextet Arcs in the Field of A1689



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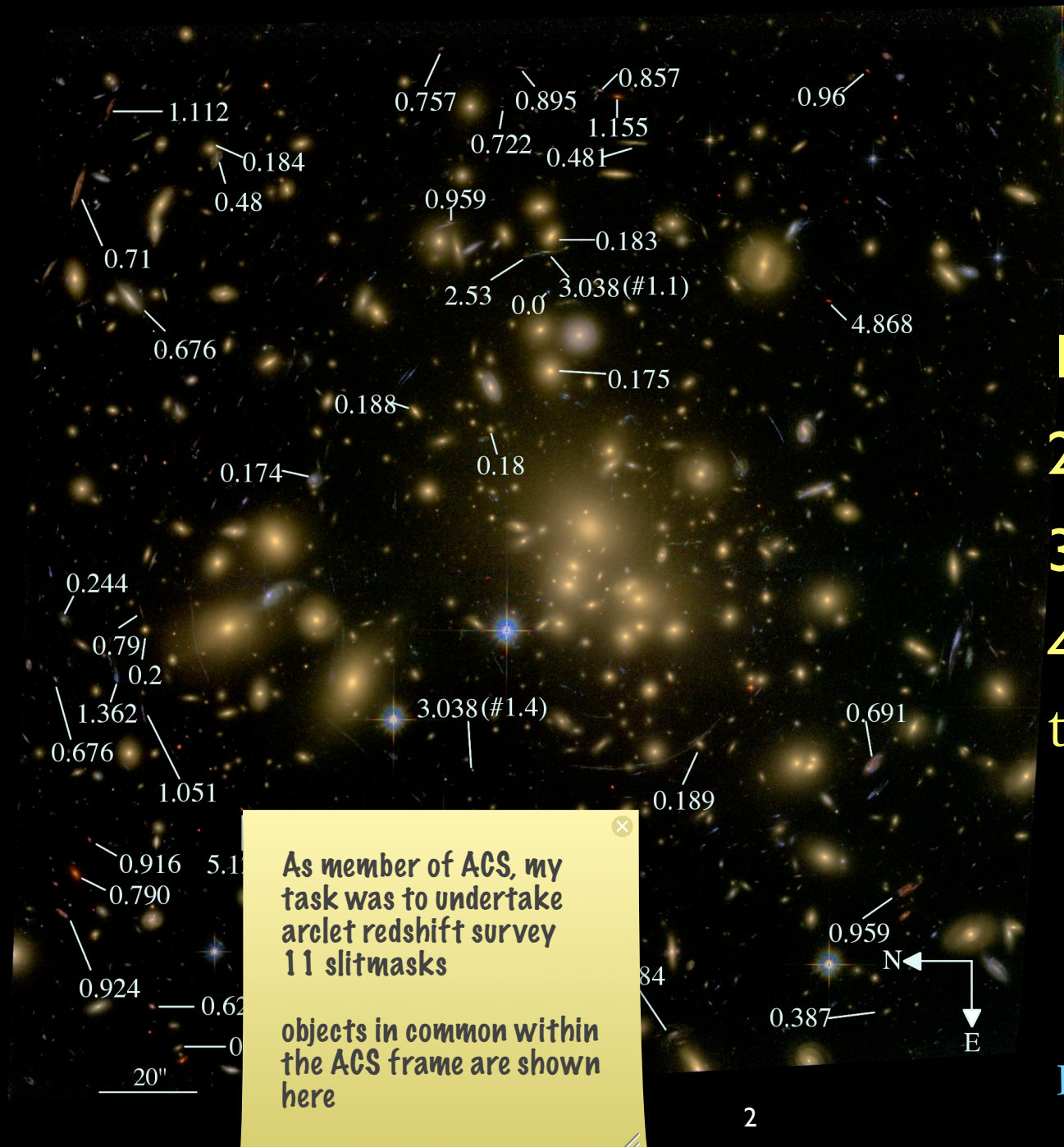
David Bowen (Princeton University),  
Dan Coe & Txitxo Benítez (CSIC),  
and others on the ACS Science

Thank you for inviting me. I am very pleased to be here virtually to present data on the strongly-lensed LBG, the Sextet Arcs

# Abell 1689

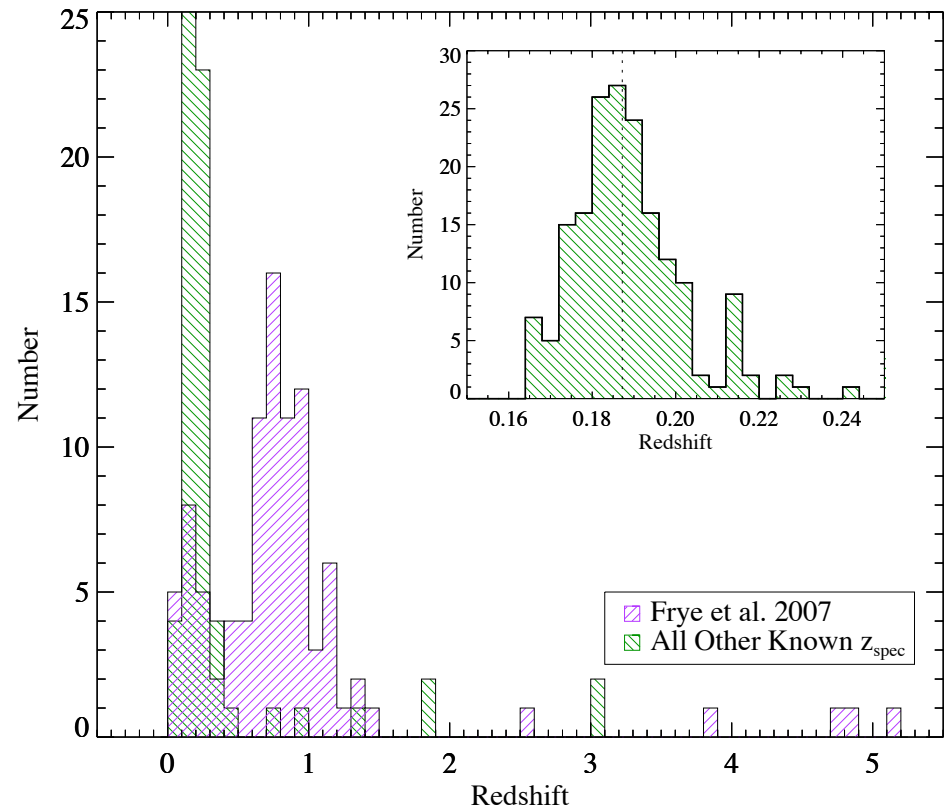
1. Arclet Survey
2. Imaging
3. Spectroscopy
4. Trends & Intrinsic Properties

Frye, et al. 2007, in press



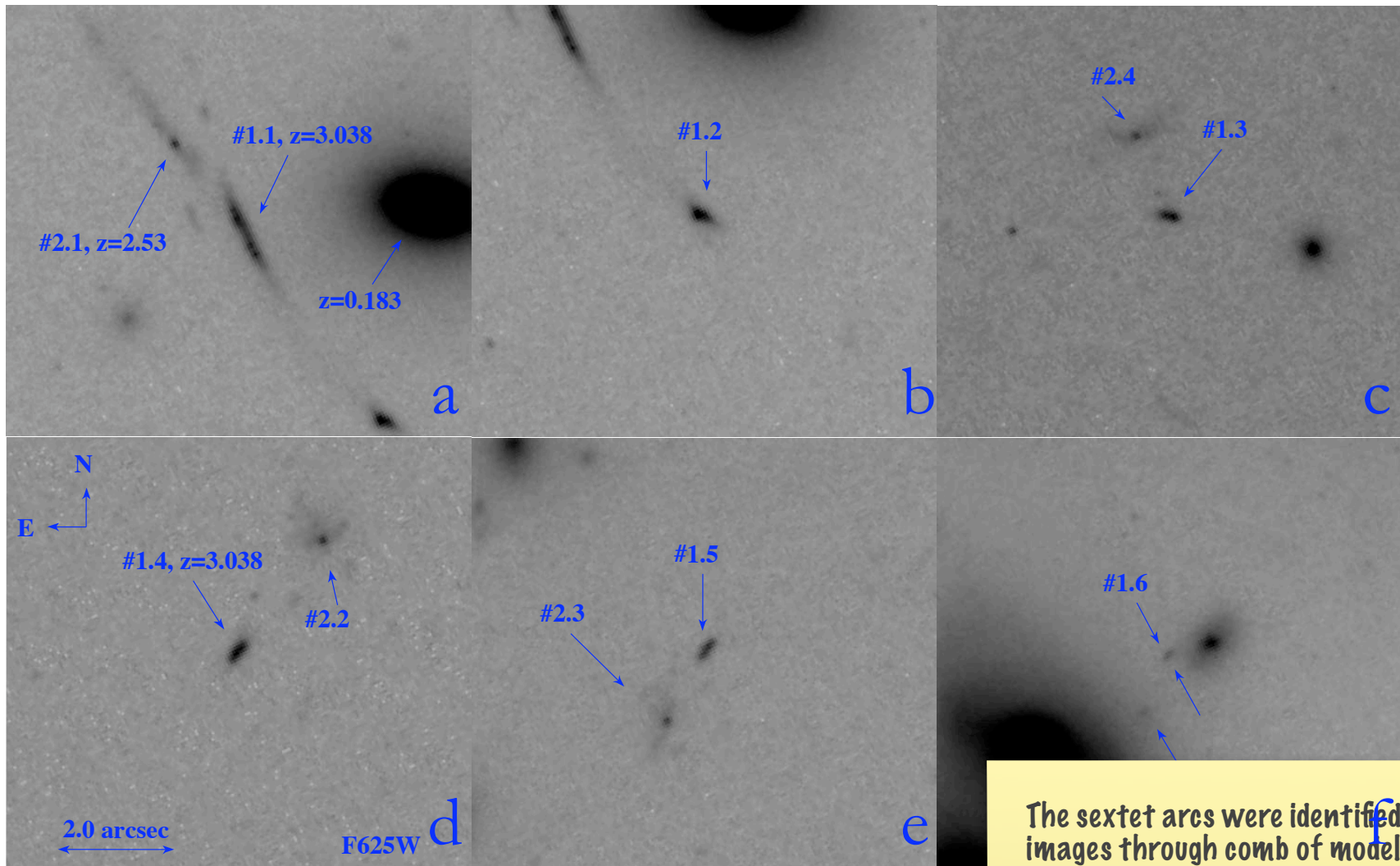
# 1. Arclet Survey Results

- 98 new redshifts, 82 behind cluster
- Purple histogram: this study
- Green histogram: all others
- Increases known objects by 6x
- Seven objects have  $z > 2.5$ , and fall within 200 arcsec from cluster center
- Inset green histogram: cluster, with the new mean redshift including all published data of  $z=0.183$  indicated



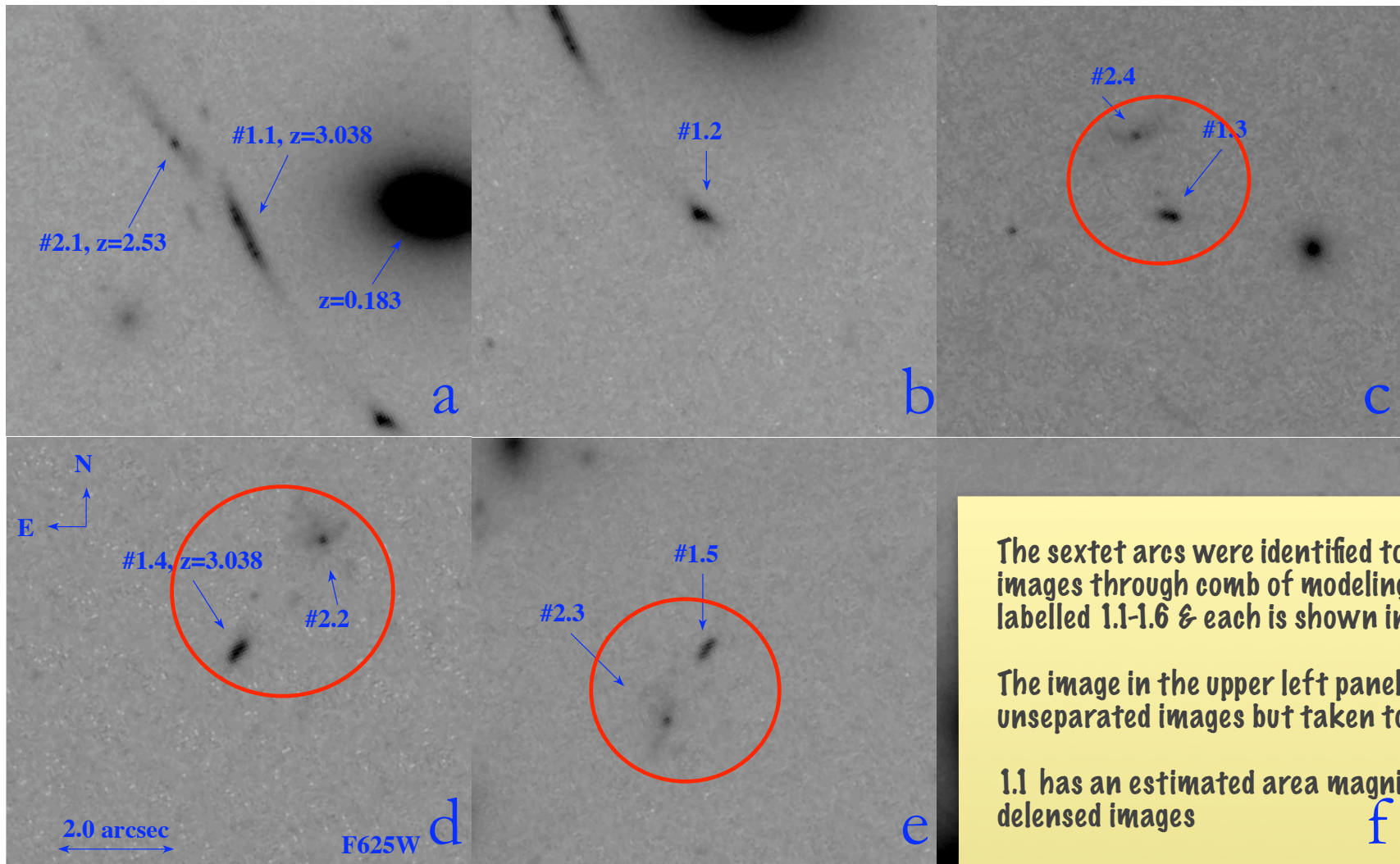


## 2. The Sextet Arcs: six separate ‘waltzing’ images with total $r_{625} = 21.7$



The sextet arcs were identified to be  
images through comb of modeling, ph  
labelled 1.1-1.6 & each is shown in the

## 2. The Sextet Arcs: six separate ‘waltzing’ images with total $r_{625} = 21.7$



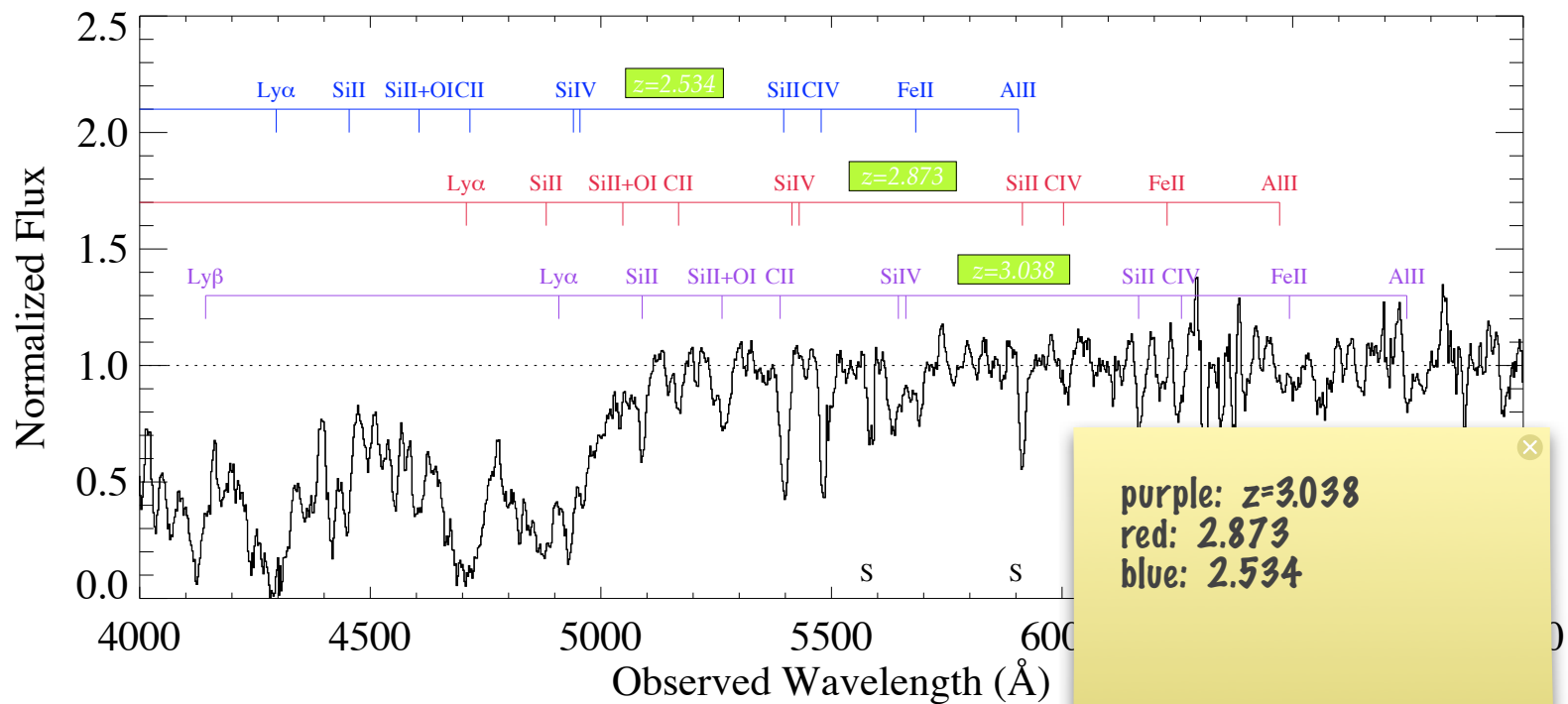
The sextet arcs were identified to be on images through comb of modeling, photometrically labelled 1.1-1.6 & each is shown in the center of the corresponding image.

The image in the upper left panel is a foreground image but taken to be on the same plane as the background images.

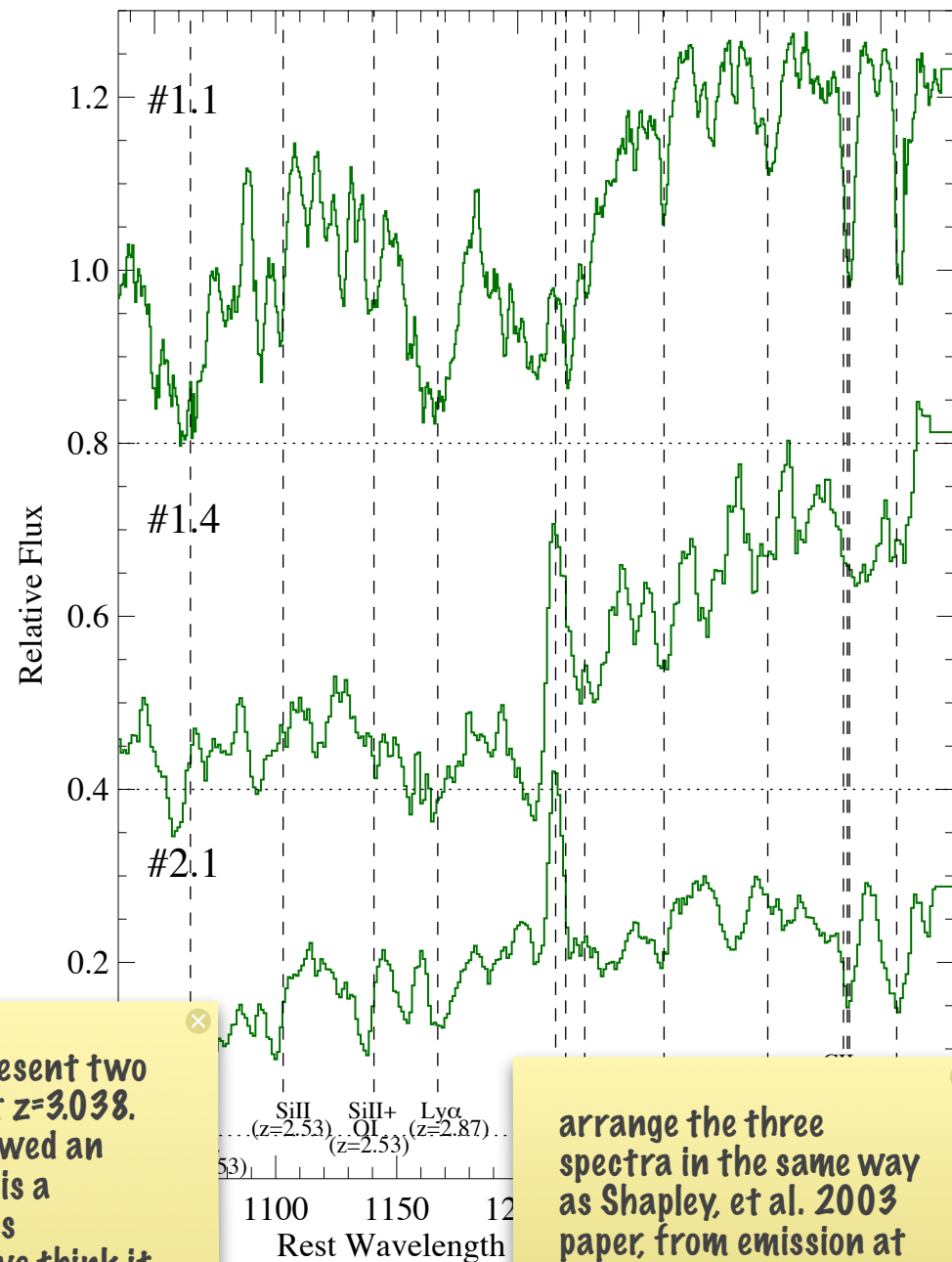
1.1 has an estimated area magnification of 1.1. The image in the upper right panel is a foreground image but taken to be on the same plane as the background images.

Image 1.2 is seen in the lower right corner of the upper middle panel and again in the center of the upper middle panel.

### 3. Spectrum of the brightest image of the Sextet Arcs at $z=3.038$ , with two high-column intervening systems



- #1.1 and #1.4 represent two different spatial regions
- #2.1 shows emission at  $z=3.038$ , and is likely another spatial region
- To our surprise, Ly- $\alpha$  varied significantly across the three los
- Range is from strong absorption, to P Cygni-type profile, and even



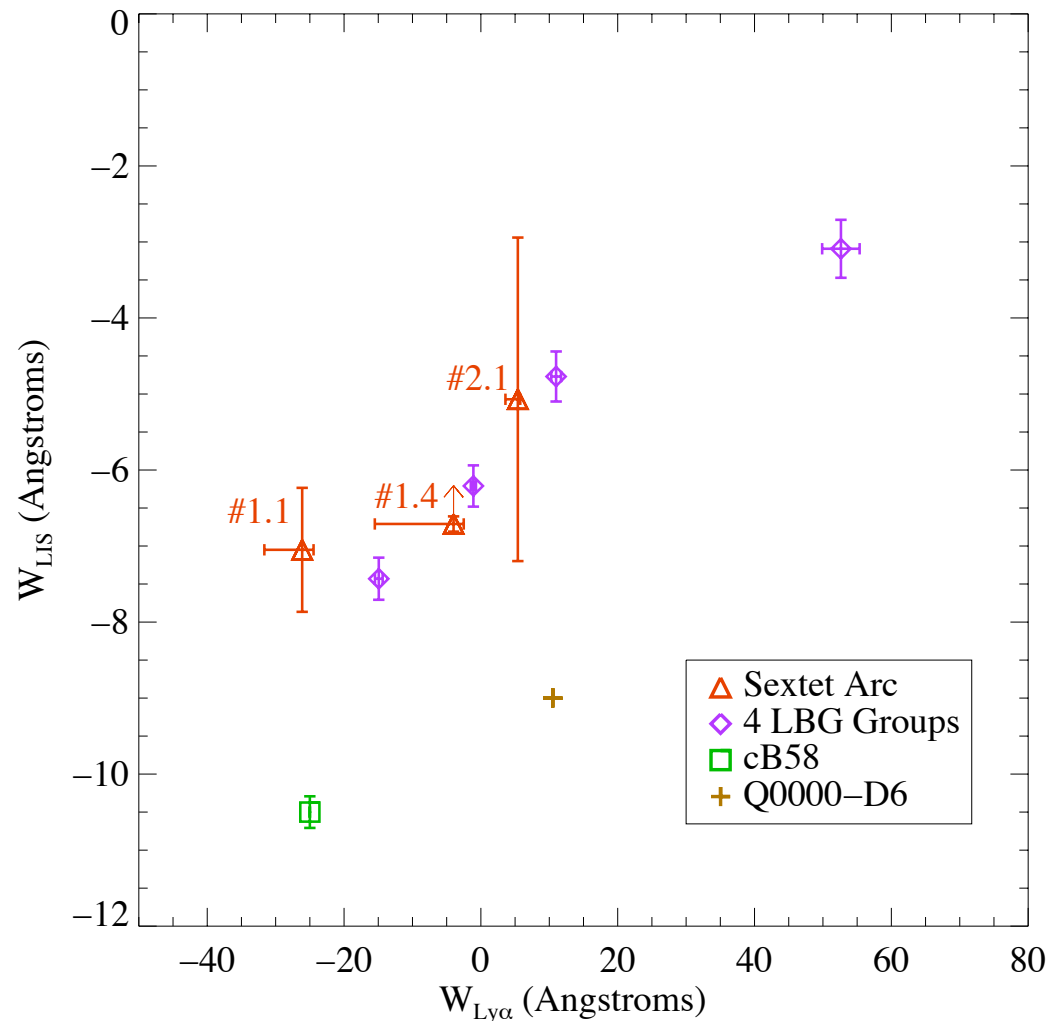
The spectra of images 1.1 and 1.4 represent two different spatial regions of the same LBG at  $z=3.038$ . The spectrum of 2.1 unexpectedly showed an emission line also at  $z=3.038$ . Perhaps it is a detection of a companion object that is independent and also at  $z=3.038$ , but we think it more likely that 1.1 may be stretched

arrange the three spectra in the same way as Shapley, et al. 2003 paper, from emission at the bottom,

# Ly-alpha Trends and Intrinsic Properties

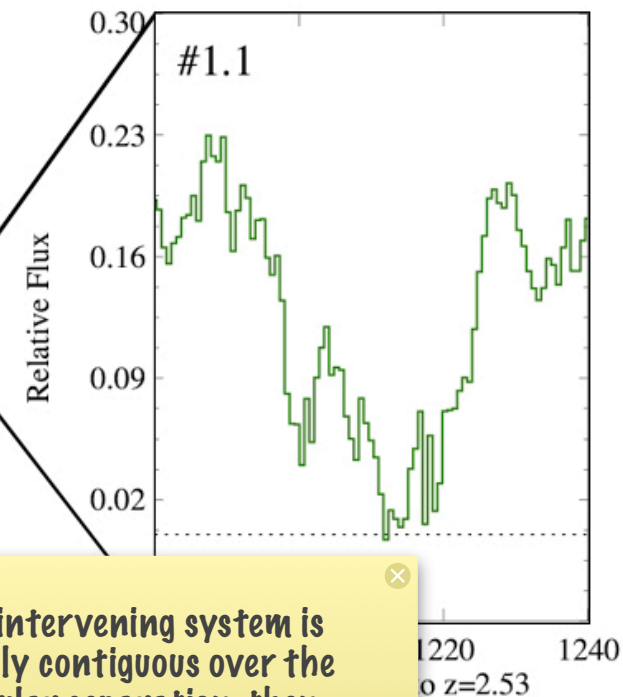
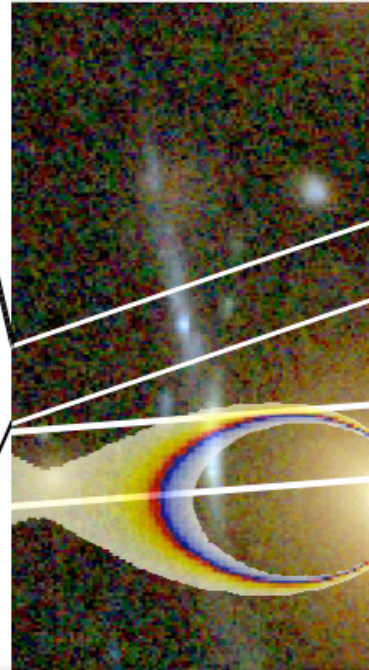
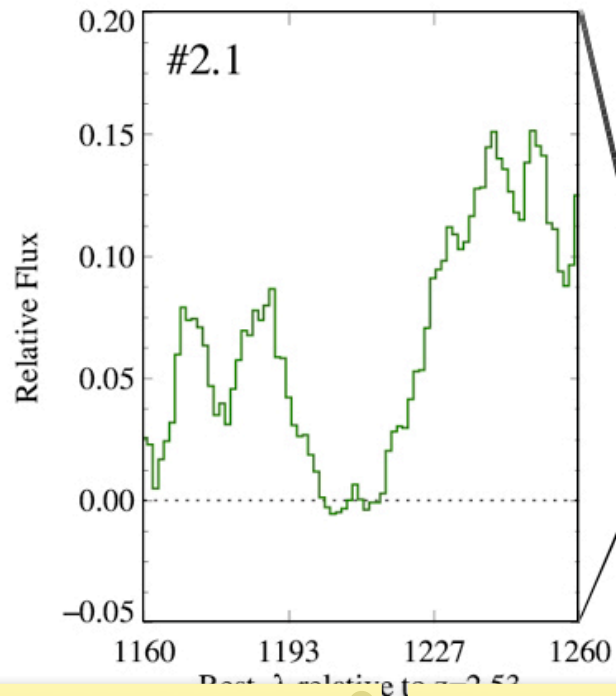
- Strength of LIS increases with  $\text{Ly}\alpha$
- $\sim 0.1 K^*$ , faint!
- $\text{SFR} \approx 4 M_{\odot}/\text{yr}$ , low!

$\Rightarrow$  How do SLLBGs compare to the sample of Steidel, et al. 2003?





# Ly-alpha at $z=2.53$ with lens model overlayed



In order to illustrate the richness of this LBG, in my final science slide I will focus on an intervening Ly-a system.

Let me orient you first: 1.1, 1.4, lens model, slits spectra. In both spectra the bright background source appears to be the Sextet Arcs

If this intervening system is spatially contiguous over the 2" angular separation, then one may be seeing a dropoff of H I with radius centered on Image 2.1, but high S/N obs are required along long axis of the arcs for us to investigate this hypothesis.



## Future Directions:

- Follow-up work with slit aligned along long axis
- Data on a triply-lensed LBG at  $z=4.9$  in preparation (20 h integration), for  $I_{AB}=23.2$ . The preliminary spectrum shows strong wind features, notably NV in P Cygni-type profile, SiIV, and CIV

## For more information:

<http://lanl.arxiv.org/abs/0704.3597>  
<http://www.physics.dcu.ie/~bfrye/sllbgs.html>

Please send your updates and new SLLBGs to:  
[bfrye@physics.dcu.ie](mailto:bfrye@physics.dcu.ie)